Dosp Project 4 - Report

Chinmai Sai Eshwar Reddy Kasi (97423328)
Venkateswarlu Tanneru (26847867)

Sunday 23rd October, 2022

Introduction:

In this report, we describe the implementation of the chord protocol in Erlang with mutliple nodes. In addition, we calculate the average number of hops required for various number of actors and give our findings for each case.

Implementation Details:

We implemented the architecture of this project following (Section 4) of the research paper provided.

How to Execute:

>c(project3).
>project3:main(NumNodes, NumRequests).

NumNodes = number of Nodes to be created
NumRequests = number of requests to be processed

Project Questions:

What is working:

- Creating the chord network.
- Joining the chord network.
- Stabilizing the network after join and updating the finger tables.
- Lookup/Searching of a key in the network.

Largest network created: 5000 nodes

Average number of hops for NumRequests = 5:

NodeCount	Average Hops
10	1.84
50	4.01
100	6.53
500	12.29
1000	26.12
2500	64.71
5000	102.56

Average number of hops for NumRequests = 10:

NodeCount	Average Hops
10	1.76
50	4.26
100	6.77
500	17.63
1000	29.09
2500	67.86
5000	120.21

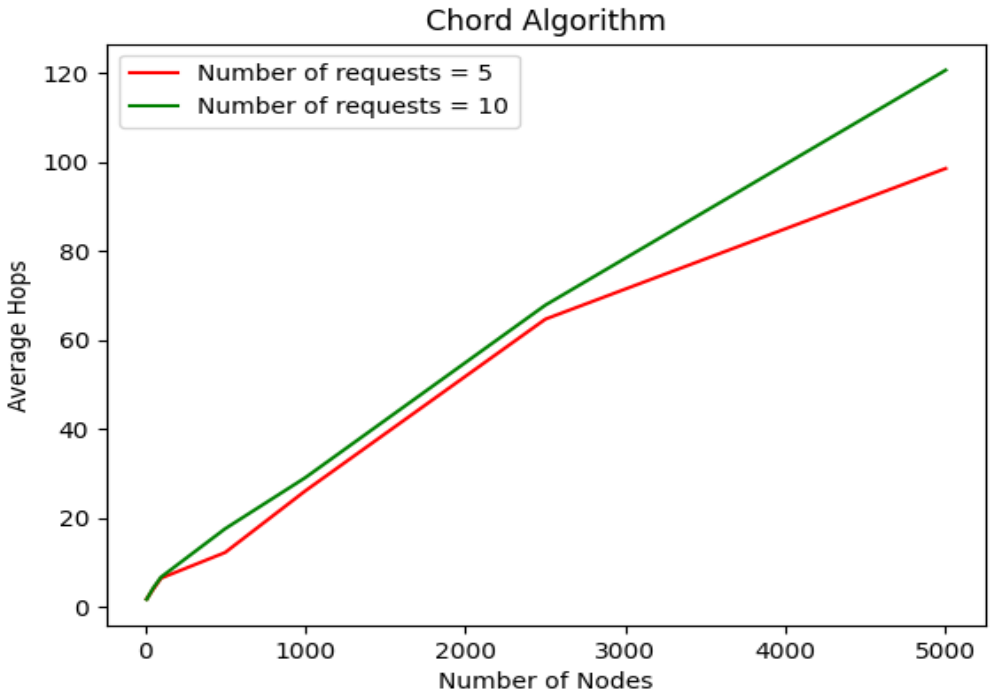

Figure 1

Observations:

The graph shows that as the number of nodes increases, so does the average number of hops. We observed an interesting finding that the average number of hops strongly depends on the produced hash value. The average hops, where we utilized randomly generated hash values as the node identifier, dramatically increased as the number of nodes and requests increased. This occurred as a resultant hash values were extremely distant from one another (sometimes by as much as 100,000), which raised the number of hops for some nodes. However, we discovered that the average number of hops significantly decreased when we used nodes numbered from 1 to NumNodes. Hence we concluded that the hash values generated using M also plays a key role in the hops needed in the network.

Average number of hops for NumRequests = 10:

NodeCount	Average Hops
10	1.72
50	2.79
100	3.66
500	4.49
1000	4.97
2500	8.04
5000	12.71

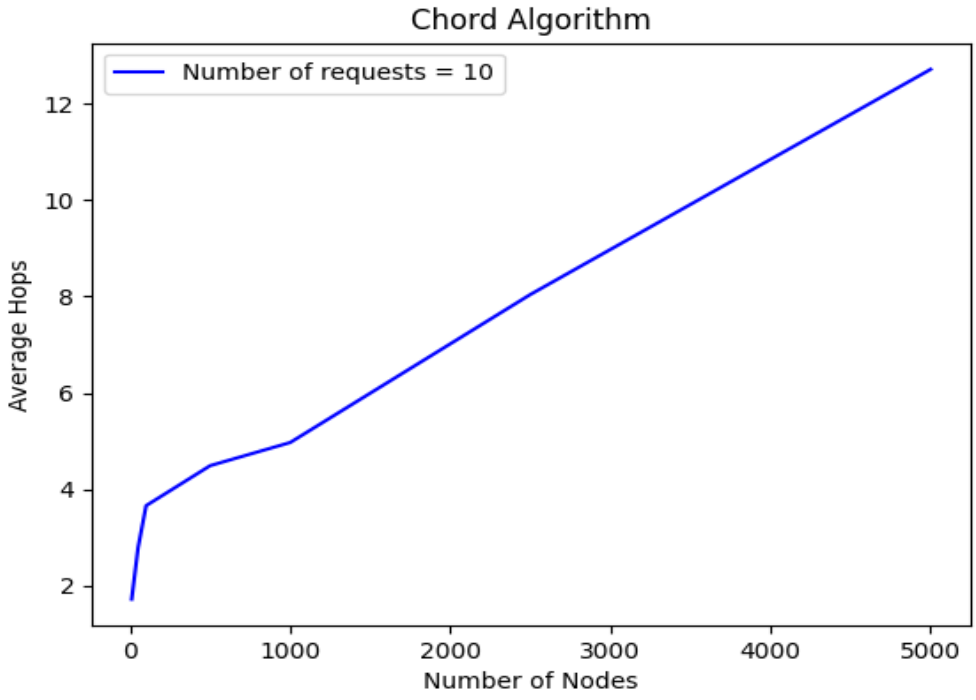

Figure 2